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Differential effects of oleic acid, sodium dodecyl sulfate, and protease inhibitors on the endopeptidase activities of the lobster multicatalytic proteinase.

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1. Lobster muscles contain a latent multicatalytic proteinase; heating at 60 degrees C for 1-2 min converts the latent form to a heat-activated form with enhanced proteolytic activity. Both forms have three endopeptidase activities, which are classified as the trypsin-like, chymotrypsin-like, and peptidylglutamylpeptide bond hydrolyzing activities. 2. Sulfhydryl reagents (mersalyl acid, N-ethylmaleimide, hemin, iodoacetamide, and p-chloromercurisulfonic acid), benzamidine, and chloromethyl ketones inhibited all three activities of the heat-activated form. Leupeptin and antipain inhibited only the trypsin-like activity, while the chymotrypsin-like activity was the most sensitive to diisopropyl fluorophosphate, phenylmethanesulfonyl fluoride, aprotinin, and soybean trypsin inhibitor. Pepstatin and L-trans-epoxysuccinylpeptides had little effect on the peptidase activities. 3. Sodium dodecyl sulfate and oleic acid preferentially activated the peptidylglutamyl-peptide hydrolyzing activity of the latent form, whereas N-ethylmaleimide stimulated both the trypsin-like and peptidylglutamyl-peptide hydrolases. These results suggest that the lobster enzyme is an atypical serine proteinase.

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